
	<p>Manufacturing, testing and supply of vacuum vessels for HNB3 (Beam Line Vessel and Beam Source Vessel) and DNB</p> <p>Section-B: Technical & management specifications, Scope of Supply and Scope of Work</p>	<p>INDUS Ref No II-D8QD8EV- V1.3</p>
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1. Introduction

1.1 ITER, ITER-India and ITER Organization

ITER will be the world's largest experimental facility to demonstrate the scientific and technological feasibility of fusion power. ITER is an international collaborative project involving seven Parties (China, European Union, India, Japan, Korea, Russia and U.S.A.). ITER is being built at Cadarache, South of France. More information can be obtained from www.iter.org or www.iter-india.org websites.

India is one of seven participating members and is responsible for the supply of some of the major systems and equipments for ITER. Some of the components for Neutral Beam System is responsibility of India through INDIA (Indian Domestic Agency).

Neutral Beam System:


The NB system for ITER consists of two heating and current drive (H&CD) NB injectors and a diagnostic neutral beam (DNB) injector. The layout allows a possible third HNB injector to be installed later. These NB injectors will be connected to equatorial ports #4 - #6 for the H&CD NBs. The DNB shares port #4 with the H&CD NB. The injectors will be located outside the cryostat inside a common enclosure, the NB cell, on north side of the Tokamak building in the L1 and the L2 levels. As they are directly coupled to the ITER vacuum vessel, the injectors are extensions of the primary confinement barrier of radioactive materials coming from the vacuum vessel. The NB cell will form the secondary confinement barrier.

1.2 Scope of this Tender

The equipment to be considered under this tender are:

- 1. Vacuum Vessel for third Heating Neutral Beam System, will be referred as 'HNB3 Vessel' henceforth. HNB3 vessel includes Beam Line Vessel (BLV) and Beam Source Vessel (BSV).**
- 2. Vacuum Vessel for Diagnostic Neutral Beam System, will be referred as 'DNB Vessel' henceforth.**

Note: These are 'in-kind' contribution being executed through the Indian Domestic Agency (INDIA) called ITER-India, Institute for Plasma Research. Organization responsible for managing the activities at ITER site is known as ITER Organization (IO). Being a responsible entity for assembly of HNB3 vessel and DNB Vessel to the ITER machine, IO will be technically involved along with ITER-India during the execution of this contract, which includes but not limited to the documentation, Technical inspections including surveillances, QA audits and audits by Nuclear safety authorities.

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The **Figure 1** shows the NB-Cell including the three HNBs and the DNB.

The **Figure 2** shows a view of the DNB Injector and its components.

The **Figure 3** shows a view of HNB3 Injector and its components.

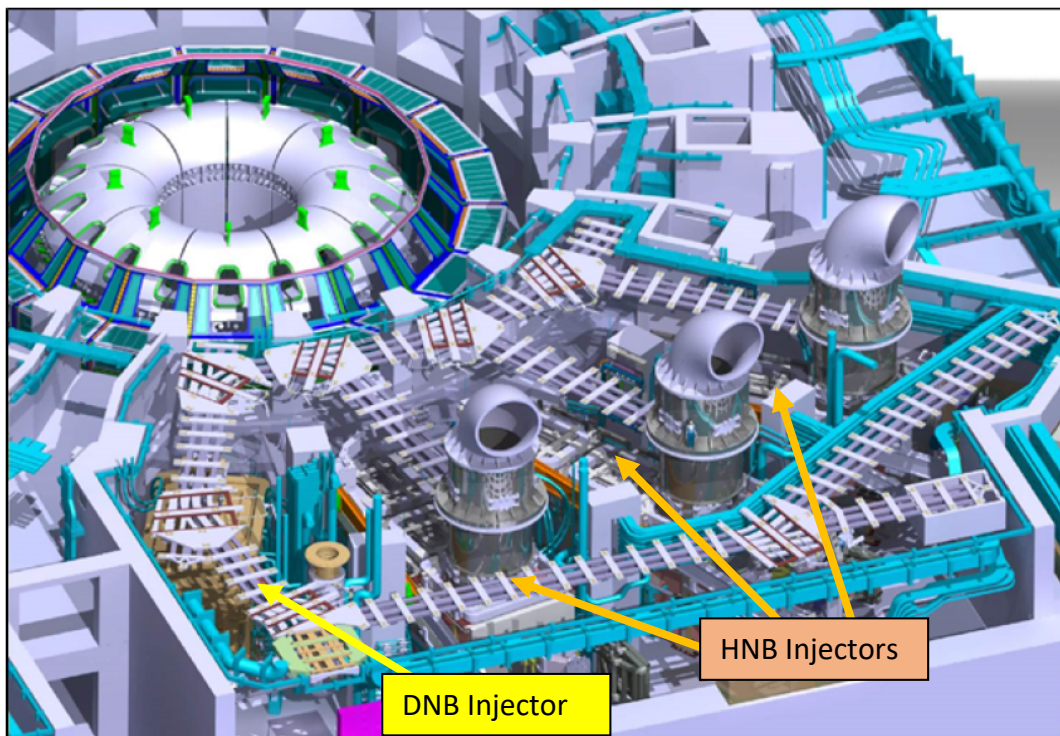


Figure 1: NB Cell including three HNB injectors and a DNB injector



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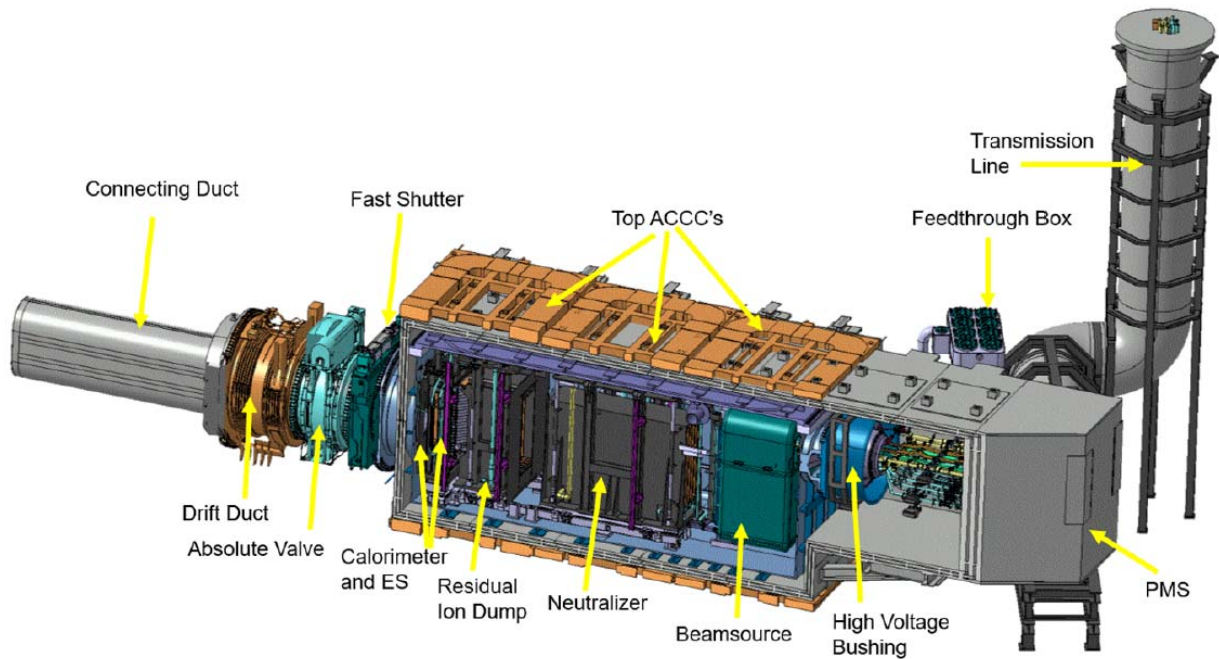


Figure 2: View of the DNB injector and its components

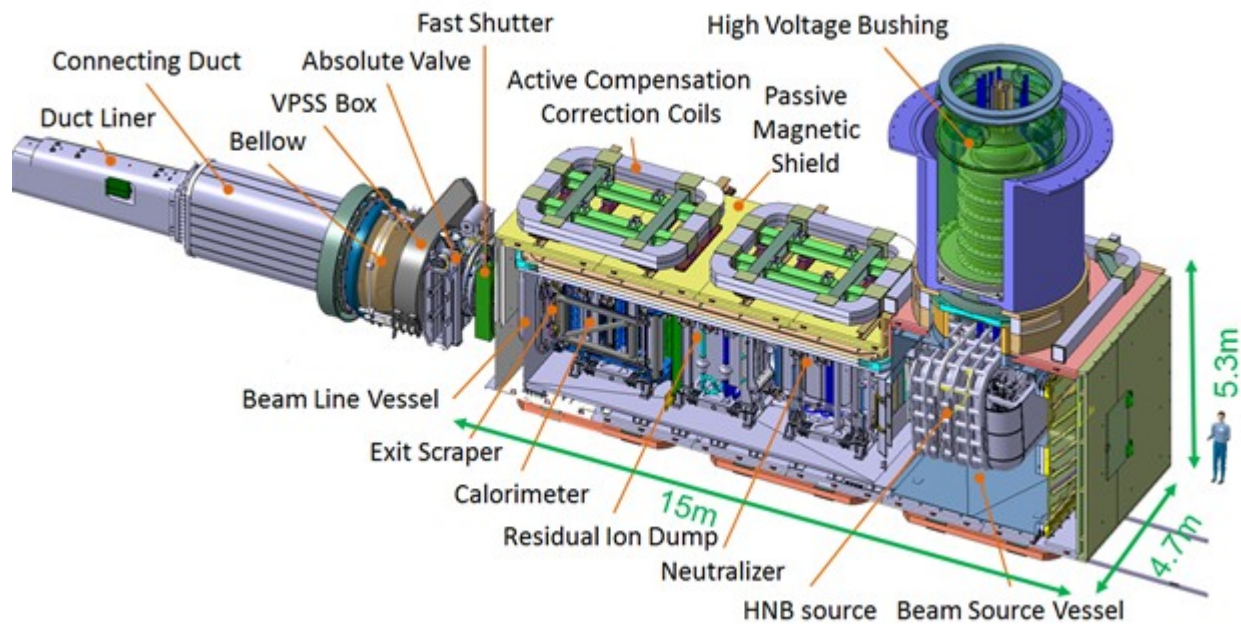



Figure 3: View of HNB3 injector and its components

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1.3 DNB Vacuum Vessel

The DNB Vacuum Vessel containment vessel is a single vessel made from non-magnetic material (stainless steel). The design of the DNB Vacuum Vessel is not the conventional cylindrical or spherical shape the pressure-vessel codes would normally expect, but is in the form of a rectangular box. The DNB Vacuum Vessel is designed to comply with the requirements of RCC-MR 2007, class 2 components and in compliance with INB order dated 7th Feb 2012.

The DNB Vacuum Vessel connects to the Fast Shutter (FS) and hosts the Exit Scraper (ES), Calorimeter, Residual Ion Dump (RID), Neutraliser and the Beam Source (BS) (Figure 2).

It has a RH compatible large lid on the top (called Top Lid) to allow for the maintenance of these components.


The vessel is surrounded by a Passive Magnetic Shield (PMS) and Active Correction and Compensation Coils (ACCC) (Figure 2) to ensure maximum transfer of neutral beam into the main torus

The DNB vessel (main shell and top lid), the High-Voltage Bushing (HVB) and the Fast Shutter (FS) assembly constitutes the Primary Vacuum Boundary for the Diagnostic Neutral Beam Line Components.

Figure 4 and 5 shows General view of the DNB Vacuum Vessel with the main interfaces.

The major force on the DNB Vacuum Vessel is the atmospheric pressure force on the outside with the inside of the vessel under high vacuum. The vessel has large flat sides and is to be designed to withstand high vacuum in Normal Operation. In addition, the DNB Vacuum Vessel must withstand the abnormal conditions of overpressure of either the Neutral Beam Cell or the overpressure of the Main Torus volume by steam which in turn potentially over-pressurises the inside of the DNB vessel.

The DNB Vacuum Vessel will be delivered to the ITER site and installed in the ITER Neutral Beam Cell.

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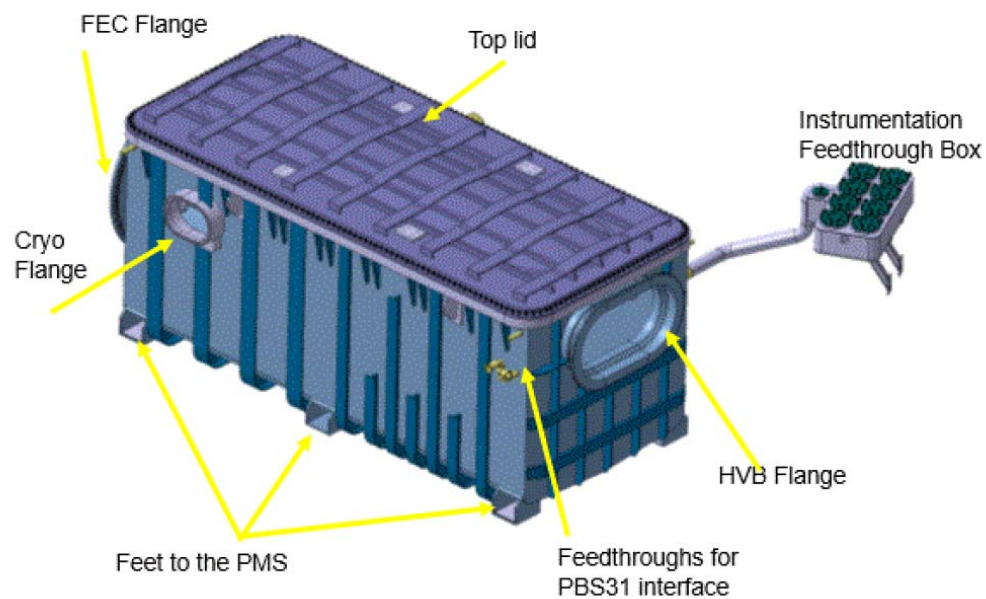


Figure 4: General view of the DNB Vacuum Vessel with the main interfaces (ITER VV left)

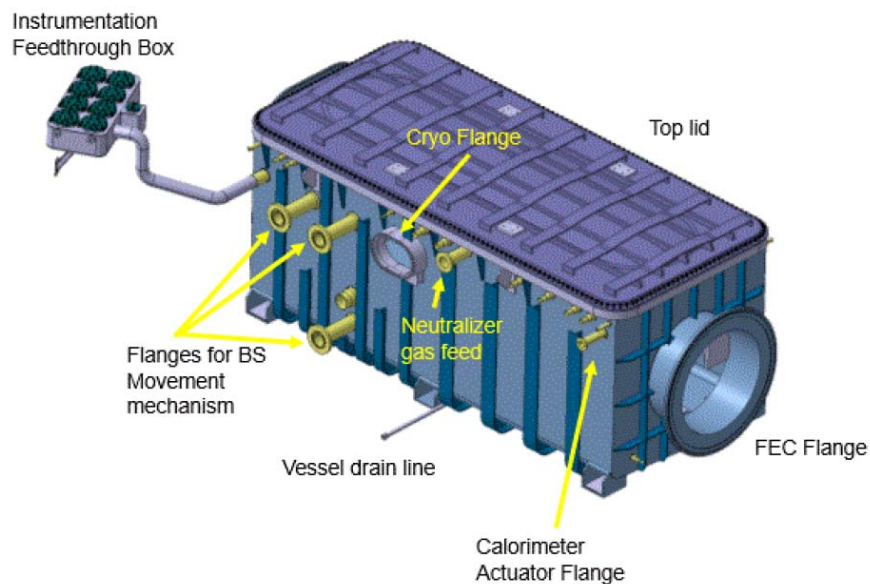



Figure 5: General view of the DNB Vacuum Vessel with the main interfaces (ITER VV right)

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1.4 HNB3 Vessel

The HNB3 Vessel is made in two parts henceforth termed the Beam Line Vessel and the Beam Source Vessel (BLV and BSV). These are considered separately for the design and construction but will be joined permanently together on site at the ITER Neutral Beam Cell. When completed with the BLV lid (Top Lid) and the BSV lid (Rear lid), the High-voltage bushing, and the Front End components, the assembly constitutes the Primary Vacuum Boundary for the Neutral Heating Beam Line Components.

The vessels are made of non-magnetic material (stainless steel) and are surrounded by a Passive Magnetic Shield (PMS) and Active Correction Compensation Coils (ACCC) to ensure that the neutral beam injection is not diverted by stray magnetic field from the main torus magnetic coils fringe field, as the beam undergoes some small amount of re-ionisation during the flight time to the plasma.

The design of the BLV and BSV is not the conventional cylindrical or spherical shape the pressure-vessel codes would normally expect, but is in the form of two flat-sided rectangular boxes. The BLV and BSV, separately and together, are designed to comply with the requirements of RCC-MR.

The HNB BLV and BSV will be welded on-site (not within the scope of this tender). The Beam Line Vessel connects to the FS and hosts the ES, Calorimeter, RID, NED and Cryopumps. It has a large lid on the top (called top lid) allowing the maintenance of these components. The Beam Source Vessel hosts the BS and has a lid (called rear lid) allowing the maintenance of the BS.

The major force on the BLV and BSV is the atmospheric force on the outside as the internals of the vessels are at full vacuum. The vessels have large flat sides and have been designed to withstand full vacuum in Normal Operation. In addition, the BLV & BSV must withstand the upset conditions of overpressure of either the Neutral Beam Cell or the overpressure of the Main Torus volume by steam which in turn potentially over-pressurises the inside of the BLV and BSV.



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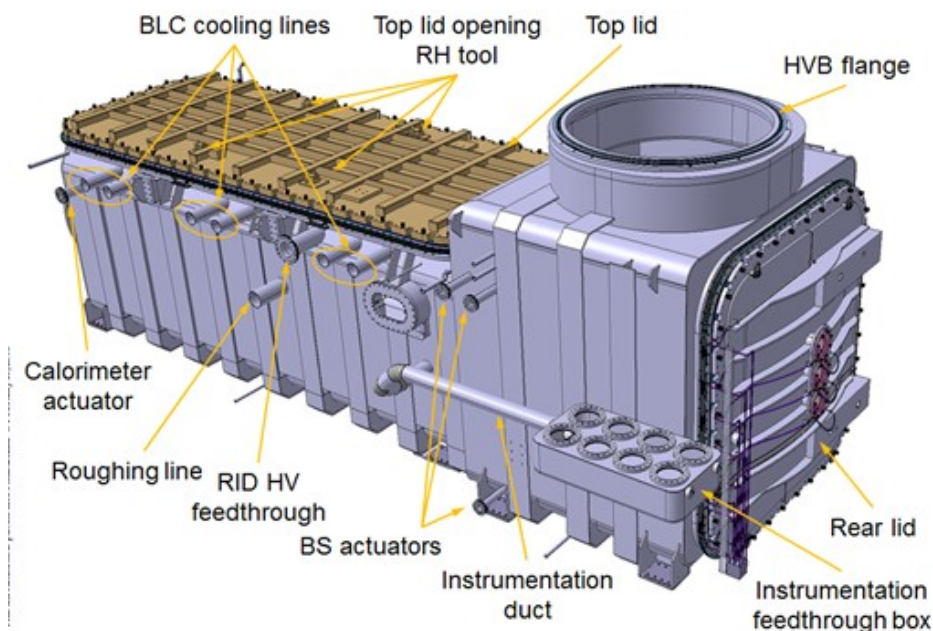


Figure 6: General view of the HNB vessel with the main interfaces (from top)

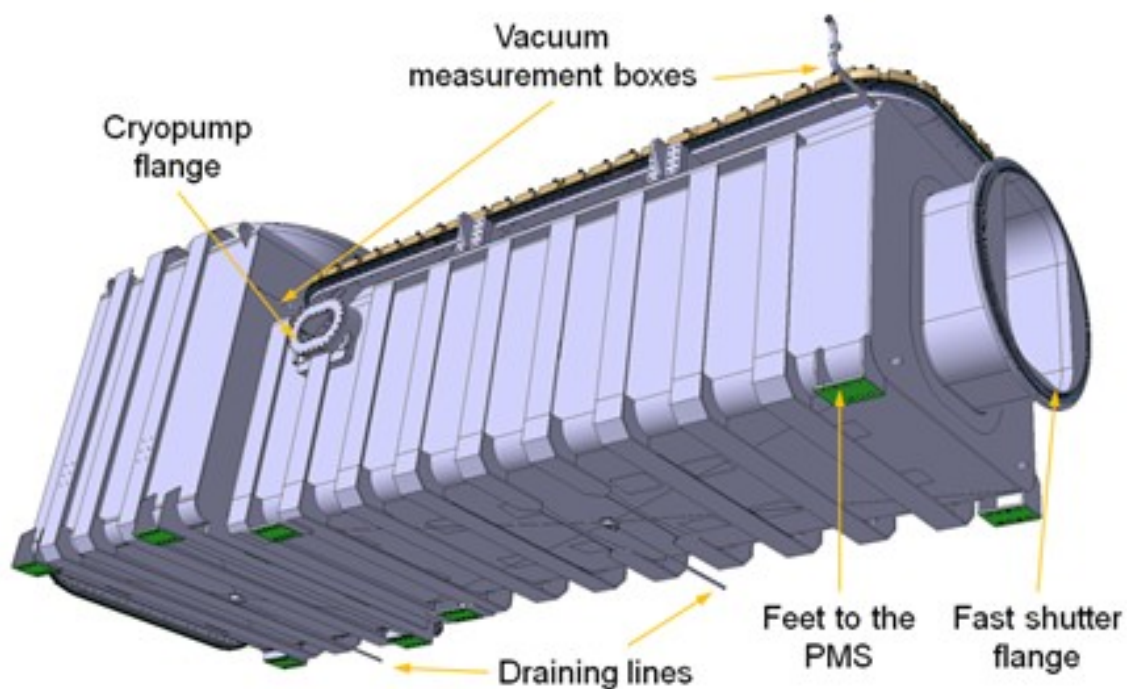



Figure 7: General view of the HNB vessel with the main interfaces (from bottom)

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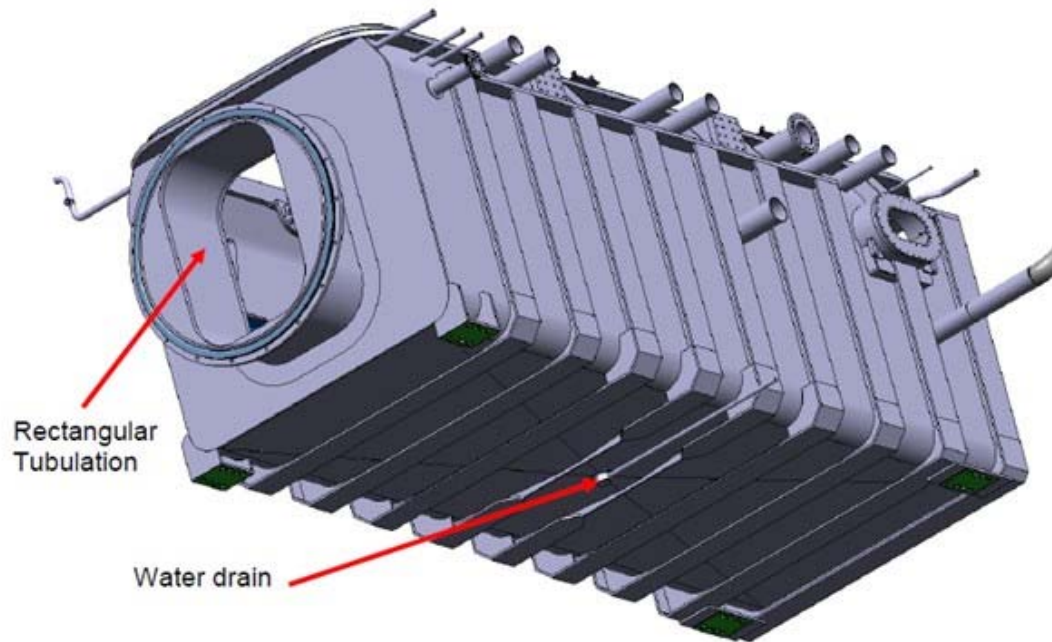


Figure 8: Beam Line Vessel (BLV)

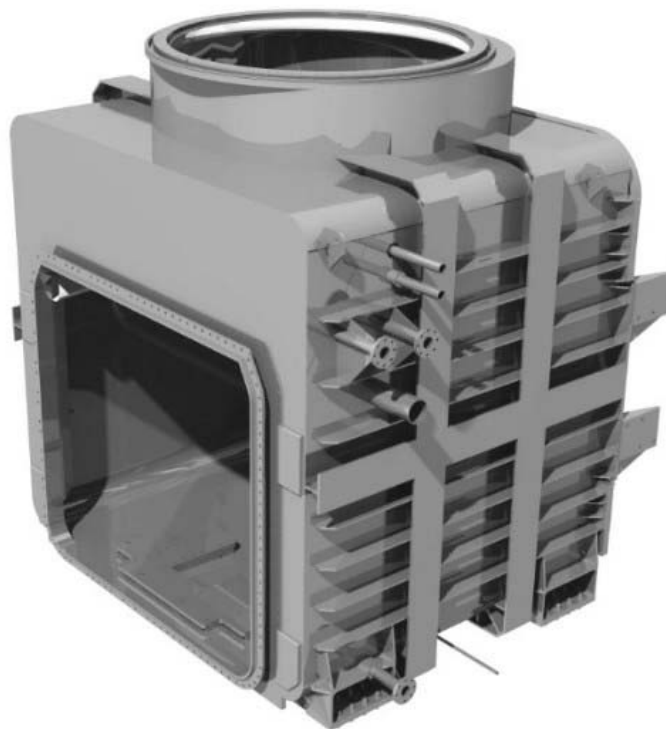



Figure 9: Beam Source Vessel (BSV)

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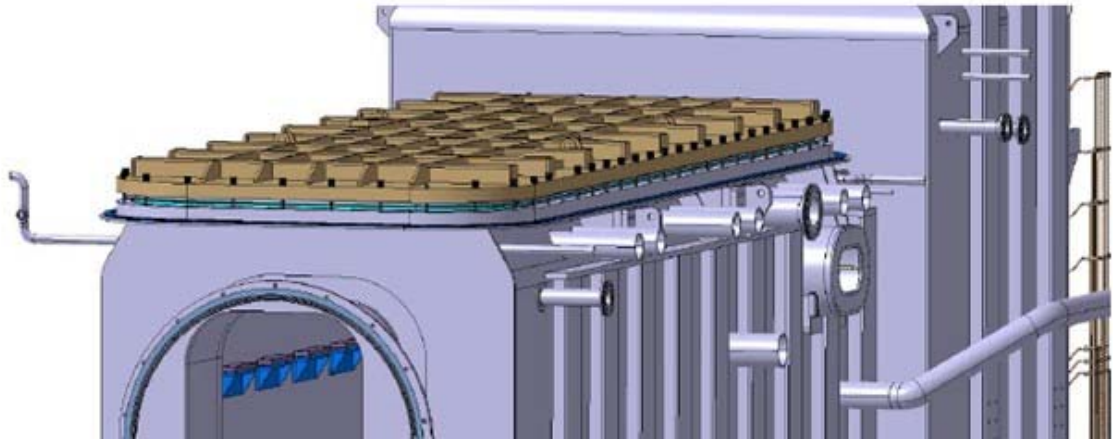



Figure 10: Top Lid bolted on BLV (Similar for DNB Vessel)



Figure 11: Rear Lid

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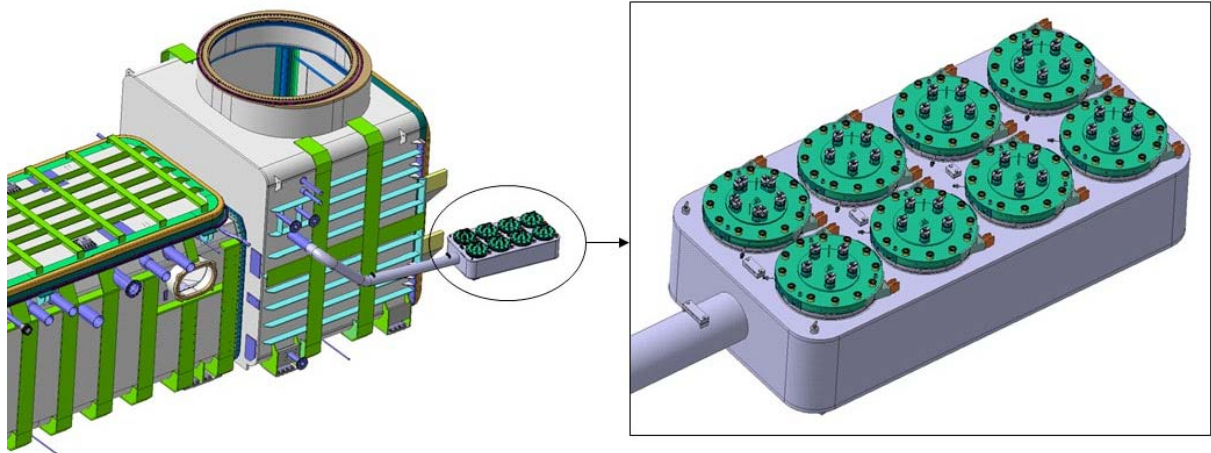


Figure 12: Instrumentation Feedthrough box (Similar for DNB Vessel)

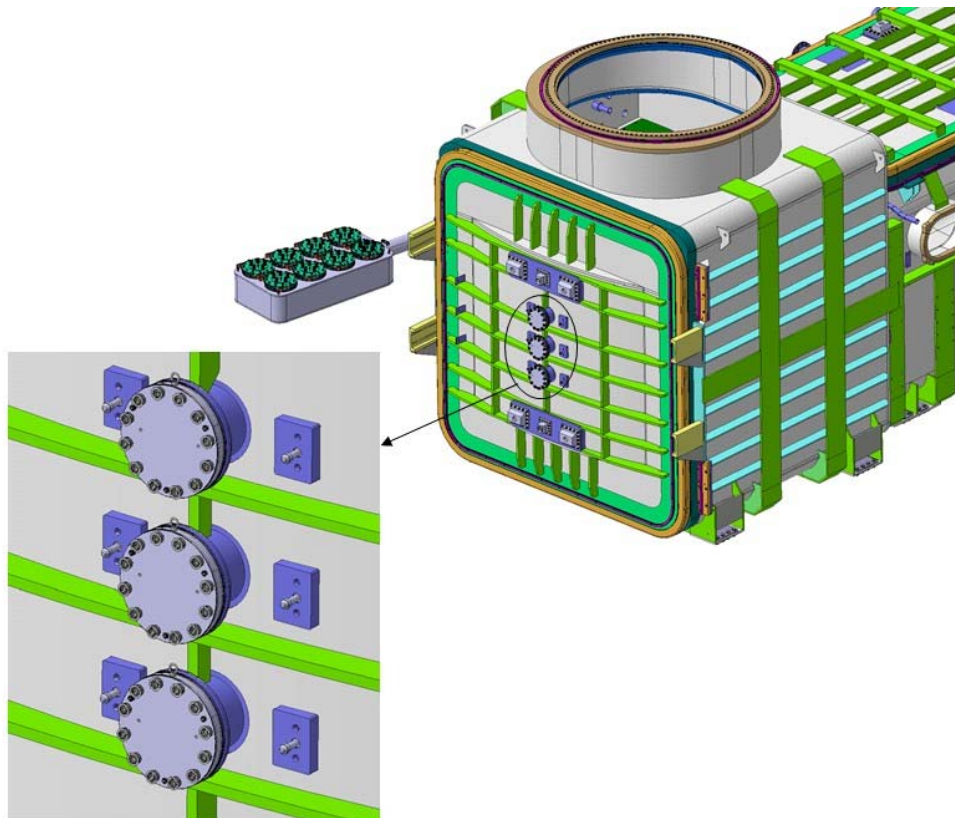


Figure 13: Cs Oven Flanges



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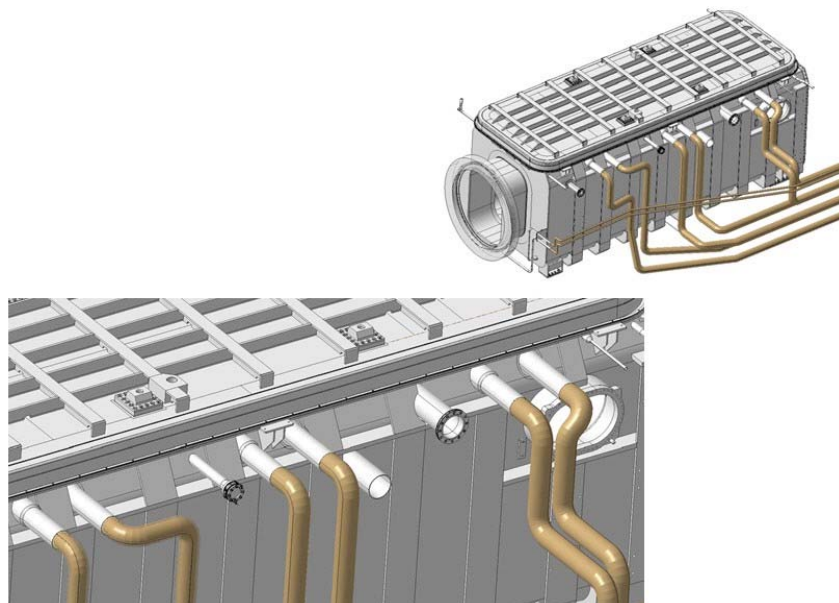


Figure 14: Cooling piping feedthrough and Cooling piping (Similar for DNB Vessel)

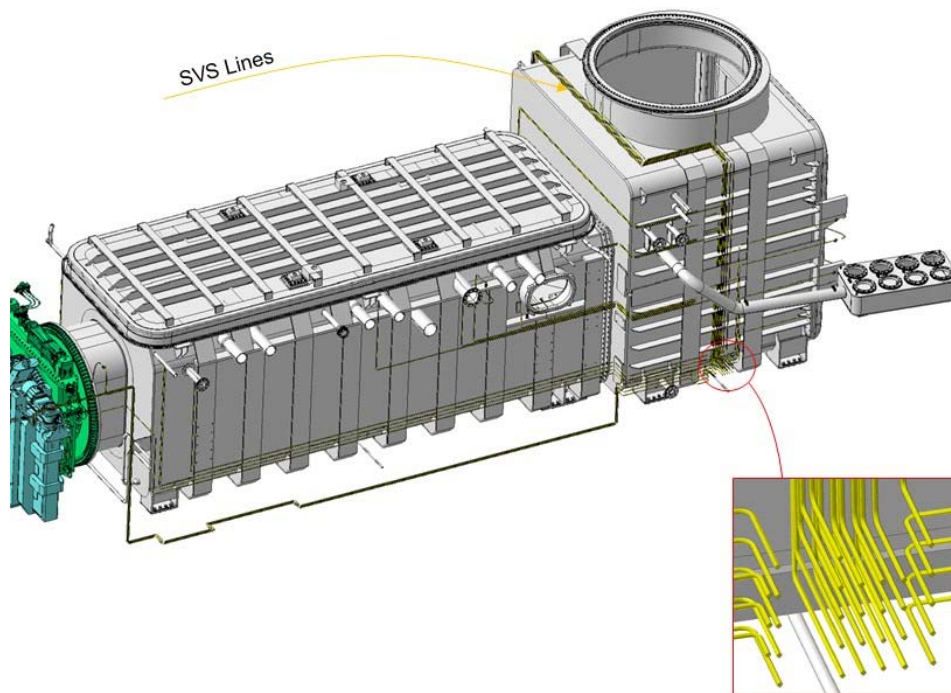




Figure 15: SVS Pipes (Similar for DNB Vessel)


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2. System Classification

DNB Vessel (In entire tender document, the component called DNB vessel includes all welded sub-structures/components listed below).						
Items	First Confinement	Safety classification	Quality Classification	Vacuum Classification	Design Code	Manufacturing code
DNB Vessel Main Shell	Yes	SIC 1	QC 1	VQC 1A	RCC- MR 2007 Class 2	RCC-MR 2007 Class 2
Top Lid	Yes	SIC 1	QC 1	VQC 1A	RCC- MR 2007 Class 2	RCC-MR 2007 Class 2
Feedthrough Box	Yes	SIC 1	QC 1	VQC 1A	RCC- MR 2007 Class 2	RCC-MR-2007 Class 2
Cooling Feedthrough	Yes	SIC 1	QC 1	VQC 1A	RCC- MR 2007 Class 2	RCC-MR 2007 Class 2
SVS piping	Yes	SIC 2	QC 1	VQC 3A	RCC- MR 2007 Class 2	RCC-MR 2007 Class 2

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HNB3 Vessel (In entire tender document, the component called HNB3 vessel includes all welded sub-structures/components listed below).						
Items	First Confinement	Safety classification	Quality Classification	Vacuum Classification	Design Code	Manufacturing code
BLV	Yes	SIC 1	QC 1	VQC 1A	RCC- MR 2007 Class 2	RCC-MR 2007 Class 2
BSV	Yes	SIC 1	QC 1	VQC 1A	RCC- MR 2007 Class 2	RCC-MR 2007 Class 2
Top Lid	Yes	SIC 1	QC 1	VQC 1A	RCC- MR 2007 Class 2	RCC-MR 2007 Class 2
Rear Lid	Yes	SIC 1	QC 1	VQC 1A	RCC- MR 2007 Class 2	RCC-MR 2007 Class 2
Feedthrough Box	Yes	SIC 1	QC 1	VQC 1A	RCC- MR 2007 Class 2	RCC-MR-2007 Class 2
Cs oven flanges	Yes	SIC 1	QC 1	VQC 1A	RCC- MR	RCC-MR 2007 Class 2
Cooling Feedthrough	Yes	SIC 1	QC 1	QC 1A	RCC- MR 2007 Class 2	RCC-MR 2007 Class 2
SVS piping	Yes	SIC 2	QC 1	VQC 3A	RCC- MR 2007 Class 2	RCC-MR 2007 Class 2

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NOTE: Some of the parts to be procured as defined in the Bills of Material will not be used during the NB operations. These parts will be needed only for needed for FAT, transportation and long term storage and PFPO1 (Pre-Fusion Power Operation 1), as applicable. These parts are not SIC-1, they do not need to comply with the Chemical composition and impurity requirements for materials and they don't need to follow the RCC-MR 2007 class 2 for manufacturing. These parts may be manufactured according to RCC-MR 2007 class3.

These parts are the ones corresponding to the following 2D drawings numbers:

HNB3 Vessel:


- 046724 - (Flange FS-BLV)
- 046726- (Flange Ext.)
- 046911 - (Vacuum Flange Cryopump)
- 046735 - (Human flange)
- 050005 - (Flange HVB-BSV)

DNB Vessel:

- 02-00-02 - (Flange FS)
- 02-00-04 - (Vacuum Flange Cryopump)
- 02-00-03- (Human flange)
- 02-00-01- (Flange HVB-BSV)

3. Scope of Supply

The scope of the basic supply includes the procurement and delivery of all the items listed in Section 3.1 (Hardware Items), 3.2 (Scope of work for DNB Vessel and HNB-3 Vessel). 3.3 (Execution), 3.4 (Manufacturing Readiness Review) and 3.5 (Delivery Readiness Review) mentioned in this document.

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3.1 Hardware Items to be supplied

The DNB Vessel and HNB3 Vessel, as per Table-1 are to be supplied as a part of this tender.

Table-1: List of Hardware Items

Sr. No.	Item	Qty (Set)
1	DNB Vessel Which includes Main shell, top lid, Instrumentation feed through box, SVS pipings, Double O ring Viton seal for the top lid, cooling penetrations (with welded closures) and other welded feedthroughs (along with double metallic seal and blind flanges) (Refer Related BoM Annexure 14 for the detailed deliverable)	01
2	HNB3 Vessel which includes BLV, BSV, Top Lid, Rear Lid, Instrumentation feedthrough box, Cs Oven Flanges, SVS pipings, Double O ring Viton seal for the top lid and rear lid, Cooling feedthroughs (with welded closures), and other welded feedthroughs / openings (along with double metallic seal and blind flanges) (Refer Related BoM Annexure 14 for the detailed deliverable)	01
3	All the jigs, fixtures and rigs to be used for Inspection, testing, handling, transportation and final acceptance tests at ITER Site	As applicable

Note-1: Following shall be supplied as Free Issue Material (FIM) from IO through ITER-India:


1. Helicoflex metallic seal for Top Lid for DNB Vessel
2. Helicoflex metallic seal for Top Lid for HNB3 Vessel (BLV)
3. Helicoflex metallic seal for Rear Lid for HNB3 Vessel (BSV)

Note-2: No ITER site work is involved in this tender except the participation during the acceptance test at IO (as per **Annexure 2**_QA, QC, Inspection and testing)

Note-3: Superbolts required for tightening the metallic seal (refer Bill of Materials) shall be procured as catalogue item as mentioned.


3.2 Scope of work for DNB Vessel and HNB-3 Vessel

- All the engineering required for the manufacturing complying with the requirements of Tender. It may be noted that CAD Models together with **Built To Print** (BtP) drawings required (e.g. general assembly drawings, interface tolerances, etc.), shall be provided by the ITER-India.
- All engineering design and analysis for jigs, fixtures and tooling, complying with the requirements of this technical specification, its annexures, and the applicable documents

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mentioned therein with consideration of manufacturing, inspection, testing, assembly, metrology.

- Design, analysis, manufacturing, inspection and testing of the transportation fixtures as per the “Annexure 12_engineering Analysis”
- Preparation of the quality assurance and the qualification procedures required to set the manufacturing process as defined in ITER Procurement Quality Requirements (22MFG4) V5.1, including the welders and NDE operators’ qualification certificates.
- Preparation of the procedures or technical descriptions for the FAT tests (Annexure 2_QA, QC, Inspection and testing), for the inspections, testing and examinations etc.
- Preparation of manufacturing drawings, as built drawings after dimensional survey of the components manufactured, complying with the requirements of clause 8.7.2 of this Section B.
- Procurement of materials specified according to the material specifications in “Annexure-4: Raw Materials” and its supporting annexure from 4A to 4H.
- Perform the welding related activities (qualification, inspection, testing etc) and associated documentation as per Annexure 6A to 6F.
- All aspects of manufacturing including cutting, forming, welding, inspection, marking, and cleaning complying with the requirements of “Annexure 5_Fabrication”
- Inspection and testing complying with the requirements of “Annexure 2_QA, QC, Inspection and testing” and as mentioned in the other parts of technical specifications.
- Factory acceptance tests prior to packing and shipment complying with the requirements of “Annexure 2_QA, QC, Inspection and testing “.
- Cleaning, complying with the requirements of “Annexure 7_Cleaning and Cleanliness “,
- Pickling and passivation complying with the requirements of “Annexure 8_Pickling and passivation”
- Engineering Analysis, as required, complying with the requirements of “Annexure 12_engineering Analysis”
- Labeling, Packing, Handling and Shipping complying with the requirements of “Annexure 13_Labeling, Packing, Handling and Shipping “
- Liaison with the ITER-India for the inspections and interventions as per MIP and for the final inspection of components in factory that are delivered to the ITER site.

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- At the end of factory fabrication, delivery of a Release Note document including certificate of compliance and justification/tracking of non-conformance and the IO acceptance through a tracking sheet.
- Prepare DNB Vessel and HNB3 vessels per requirement of “Annexure 13_Labeling, Packing, Handling and Shipping”. Loading the DNB Vessel and HNB3 vessel on transport vehicle and transportation from bidder's premises to the Indian Port (any one out of Nhavasheva (JNPT)/Mumbai, Chennai and Hazira) is in the scope of bidder, i.e Free On Board (FOB) Indian Port as per Incoterms 2020 for both the vessels. Contractor needs to specify any one port out of these three Indian ports in their bid. ITER-India shall undertake the remaining scope of transportation through separate contract under the Global Transportation Program with IO.
- Final Acceptance of the Items shall be performed by the IO at the ITER Site with ITER-India and Bidder’s participation. The IO and ITER-India shall grant the Final Acceptance which marks conclusion of this tender.


3.3 Execution stages

The execution of the contract shall typically be consisting of the following stages. The first stage includes the Manufacturing study and engineering for all parts. the final stage concludes with the delivery to the ITER site and Final acceptance test on site.


The stages presented below, Table-2, are bare minimum and based on the contractors’ judgement, it may be expanded in consultation with ITER-India. Based on the suitability of the contractors, some of the stages can be executed in parallel, subjected to the agreement with ITER-India and IO.

Table-2: Execution stages


Execution Stage	Typical list of activities
Manufacturing Study	Selection of manufacturing processes and the raw material form
	Perform the welding distortion study / Distortion management plan for the complete vessel and propose the best suitable methodology for welding, jigging, fixturing and sequencing, if coupons and/or simulations are foreseen, how and when the distortions will be measured to ensure that the final dimensional tolerances are complied with. This may be through software simulation.
	Checking of the 3D CAD models regarding the manufacturing feasibility (welding, NDE, Inspection etc.).

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	<p>Manufacturing design and production of manufacturing drawings with tolerance, welding and other manufacturing requirement.</p> <p>Design of fabrication jigs & Fixtures required for Manufacturing (including those are required to minimize the distortion) To note: Jigs and fixtures (which are going to be in direct contact of any of the vessel component/ sub-component shall be manufactured from the material compatible to SS or at least have a cladding at the contact surface with the component).</p> <p>Design of test rigs for leak tests (Annexure 10_ Leak Testing)</p> <p>Development of NDT procedures (including UT examination of stainless steel welds, and if used, LPT for surface examination)</p> <p>Qualification of manufacturing processes like materials, welding, NDT, leak testing, dimensional inspection as required by tech specs.</p> <p>Propose Manufacturing realization plan and schedule complying with the tender requirements</p> <p>Materials and components identification and marking procedure</p> <p>Preparation and finalization of welding and NDE procedures</p> <p>Preparation and finalization of Manufacturing and Inspection Plans (MIP/IP) and all other QA Documents as per quality requirements</p> <p>Transport plan: The Bidder shall define suitable packaging / fixturing for protection to prevent distortion or shock on the DNB Vessel and HNB3 vessel. The proposals of the transportation fixture, presented with 2D drawings, 3D CAD and FEA analysis, shall be submitted to ITER-India for approval.</p> <p>Preparation of any other procedure that is required by this specification.</p>
Manufacturing Readiness Review	<p>Conduct MRR in coordination with ITER-India and IO as per the IO guidelines ITER_D_ 44SZYP</p> <p>MRR shall be present the outcome of all the activities performed in the previous stage (i.e Manufacturing Study).</p> <p>Detailed Schedule of the all the activities included in the tender, to be submitted. This shall be in line with the overall milestone / delivery schedule given in the tender document.</p> <p>Document deliverables: Refer clause 3.3 for more details</p>
Material Procurement	<p>Material procurement shall be according to the material specifications in "Annexure 4_Materials" and its sub-annexures along with compliance of QA requirements</p>
Manufacturing	<p>Manufacturing of jigs and fixture required for the manufacturing.</p> <p>Execution of the manufacturing processes like cutting, machining, forming, welding etc. Perform the necessary inspection, NDT,</p>

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	integration, assembly and cleaning as required by the tech spec and approved MIP. Perform and maintain the qualification of the Welding operators, the welding procedures and the NDE personnel. Ensure the vacuum requirements as per the specification and ITER Vacuum Handbook
	Document deliverables: <ul style="list-style-type: none"> • Update welding databook (WPS / PQR / WPQR) • Welding monitoring sheet / Weld Data Sheet • RT Examination reports and films • Liquid Dye Penetrant Examination reports • Alternative NDE and reports • He Leak (intermediate if any before FAT) detection examination reports • Pressure test reports
Factory Acceptance test	At the end of factory fabrication, delivery of an End of Manufacturing report including certificate of compliance and justification/tracking of non-conformance and acceptance through a tracking sheet Factory Acceptance Tests (including vacuum leak test complying with the requirements) prior to packing and shipment. Delivery of Acceptance Data Package (ADP) files Factory packing according to “Annexure 13_Labeling, Packing, Handling and Shipping” Document deliverables: <ul style="list-style-type: none"> • Inspection (metrology and visual) report • Final cleaning report • Leak test report • As built CAD models for the parts outside the tolerances and covered by a NCR • As built 2D drawings
End of manufacturing documentation	End of manufacturing documentation EMR (End of manufacturing Report). This includes the certificate of compliance, all information related to welds, examinations and tests, non-conformance.
Final Site Acceptance Test	As per Annexure 2_QA, QC, Inspection and testing At the end of Final Acceptance, Delivery of the End of Manufacturing files including certificate of compliance, build-to-print file and justification/tracking of non-conformances and I-I/O's acceptance

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	<p>through a tracking sheet. The End of Manufacturing file also includes the collection of all files and records.</p> <p>Document Deliverables:</p> <ul style="list-style-type: none"> • Packing, shipping, handling procedure • Delivery report • Contractor Release Note (CRN) • Inspection report after transport to IO site
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3.4 Manufacturing Readiness Review

The last Review before manufacturing is the Manufacturing Readiness Review (MRR) that gives the go- ahead for the manufacturing of the components.

Manufacturing Readiness Review (MRR) consists of a set of source verification activities to be performed before fabrication to provide confidence that manufacturing process and activities, such as fabrication, storage, handling, shipping of product, are adequately and effectively performed.


Any manufacturing activities shall be authorized by a MRR [ITER_D_ 44SZYP]. Nevertheless, some activities as; Material Procurement, some qualification, prototyping, may start before a MRR with mutual agreement.

Bidder shall be responsible for preparation, implementation, and follow-up action of MRR.

Bidder shall prepare MRR Plan.


Bidder shall organize MRR meetings in consultation with ITER-India / IO.

Bidder shall prepare MRR Report.


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The following documents shall be presented during the MRR:


ITEM	Type of document	Title of Document	Status	Action (for the panel members) at MRR / Comments
1	QA	Deviations IF ANY	Approved	Consulted
2	C&S	Purchase Order Specification for based material and filler material	Approved	Consulted and commented if not yet issued.
3	QA	Supplier Quality Plan (provided at kick off meeting) (The Main review should take place at the contractual Kick off meeting)	Approved	Consulted
4	Safety	Supplier Risk management Plan (provided at kick off meeting)	Approved	Consulted
5	Design	Manufacturing drawings	Provided	Reviewed
6	Manufacturing	Material certificates	The document reference shall be provided	Documentation, will be reviewed by INDIA/IO when available at the relevant stage of the manufacturing To be approved by IO before start of the manufacturing
7	QA	Fabrication shop / workshop detailed description for the complete assembly of the NB Vessels Note: The workshop qualification is part of the Quality Plan . (The Main review should take place before MRR)	Provided	Consulted
8	QA	MIP (that included PIAs) for the NB Vessels	Provided	Reviewed

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9	QA	Welding Data Package (WDP) WPS / PQR/ WPQR	Approved at the MRR (recommended or later when material is Available but before the manufacturing activities)	Reviewed
10	QA	Distortion Management Plan (defined in this section)	Provided	Reviewed
11	QA	Non Destructive Examination (NDE) procedure (8.1.1)	Provided	Reviewed
12	QA	Equipment identification, marking and traceability procedure	Provided	Reviewed
13	QA	Material identification and Marking procedure	Provided	Reviewed
14	QA	Dimensional checking procedure / Dimensional Control Plan (DCP) (see Annexure 11_Dimensional Inspection)	Provided	Reviewed
15	QA	Heat Treatment Procedure (If needed)	Provided	Reviewed
16	QA	Pickling and Passivation Procedure	Provided	Reviewed
17	QA	Cleaning Procedure / Clean condition work plan	Provided	Reviewed
18	QA	Leak Detection examination procedure	Provided	Reviewed
19	QA	Pressure test description and procedure	Provided	Reviewed

	<p>Manufacturing, testing and supply of vacuum vessels for HNB3 (Beam Line Vessel and Beam Source Vessel) and DNB</p> <p>Section-B: Technical & management specifications, Scope of Supply and Scope of Work</p>	<p>INDUS Ref No II-D8QD8EV- V1.3</p>
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20	QA	Packing procedure (outlining the major aspects, the complete procedure being provided at a later relevant stage)	Provided	Reviewed
21	QA	Storage procedure (outlining the major aspects, the complete procedure being provided at a later relevant stage)	Provided	Reviewed
22	QA	Transportation procedure (outlining the major aspects, the complete procedure being provided at a later relevant stage)	Provided	Reviewed
23	Design	As Built 3D models when requested by IO (for the parts of the NB Vessels covered by an NCR)	The document reference (IDM Placeholder) shall be provided	Documentation, will be reviewed by INDIA/IO when available at the relevant stage of the manufacturing
24	Design	As Built manufacturing drawings (for the dimensions outside the tolerances and covered by an NCR)	The document reference (IDM Placeholder) shall be provided	Documentation, will be reviewed by INDIA/IO when available at the relevant stage of the manufacturing
25	QA	End of Manufacturing Report (EMR) Table of content for EMR to be defined and agreed	The document reference (IDM Placeholder) shall be provided	Documentation, will be reviewed by INDIA/IO when available at the relevant stage of the manufacturing
26		Leak test acceptance test report	The document reference (IDM Placeholder) shall be provided	Documentation, will be reviewed by INDIA/IO when available at the relevant stage of the manufacturing (final acceptance in factory)

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27	Design	Manufacturing Design Report for the parts (jigs, tools, etc..) designed by Manufacturer	The document reference (IDM Placeholder) shall be provided	Documentation, will be reviewed by INDIA/IO when available at the relevant stage of the manufacturing
28	Design	Analysis Reports for the parts (jigs, tools, etc) designed by Manufacturer if needed.	The document reference (IDM Placeholder) shall be provided	Documentation, will be reviewed by INDIA/IO when available at the relevant stage of the manufacturing
29	QA	Delivery description report	The document reference (IDM Placeholder) shall be provided	Documentation, will be reviewed by INDIA/IO when available at the relevant stage of the manufacturing (before shipping)

3.5 Delivery Readiness Review (DRR)

Delivery Readiness Review (DRR) consists to ensure the required and relevant documentation and data has been provided in accordance with the contractual requirements and MQP procedures.

Any delivery activities shall be authorized by a DRR [As per Working_Instruction_for_the_Delivery_Rea_X3NEGB_v2_0 along with Delivery_Report_Template_WZPYVZ_v2_6 23].


Bidder shall be responsible for preparation, implementation, and follow-up action of DRR, in consultation with ITER-India.

Bidder shall be responsible for the preparation of the required document for DRR, in consultation with ITER-India.

The following documents shall be presented during the DRR: Contractor Release Note, Delivery Report, Packing List, and Equipment Storage & Preservation Requirements Form

4. Nuclear safety requirements

(in accordance with INB ORDER DATED 7th FEBRUARY 2012)

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The DNB Vessel and HNB3 vessel are Protection Important Components (PIC) since it provides primary vacuum barrier and radiological confinement.


The Bidder and its sub-contractors shall take a note that:

- ITER is a nuclear facility identified in France by the number-INB-174;
- The compliance with the INB-order must be demonstrated in the chain of Bidder and its Subcontractors;
- French quality order 7th February 2012 is applicable for supply of this tender as it is classified as a protection important component (PIC) as per French regulation
- All Protection Important Activities (PIA) are also subjected to supervision done by Nuclear Operator in application to article II.2.5.4 of the **Order 7th February 2012.**

DNB Vessel and HNB3 Vessel, being Protection Important Components (PIC), and shall be subject to continuous / random / surprise check by IO / ANB, the Bidder and its sub-contractors shall ensure the following during the entire course of execution of this tender:

- Bidder shall ensure the generic safety requirements, as described in **"Provisions for Implementation of the Generic Safety Requirements by the External Interveners ITER_D_SBSTBM v2.2"** shall be complied in entire chain of supplier and subcontractor with a specific stipulated management system to perform protection important activities.
- ITER-India / IO will be performing the Overall Surveillance for External Interveners Chain for Protection Important Components, Structures and Systems and Protection Important Activities following the document- **"ITER_D_4EUQFL - Overall Surveillance Plan of the Chain of External Actors for Protection Important Components, Structures and Systems and Protection Important Activities"**
- The (Protection Important Activity) PIA shall be clearly identified in the Manufacturing and Inspection Plan (MIP)/Inspection Plan(IP). The safety functions and associated PIA shall be described in a Quality Plan (QP) of bidder. The same shall also be described in the Quality Plan of the sub-supplier as applicable. These documents (MIP/IP & QP) shall be approved by ITER-India and IO before starting the manufacturing process. Primary list of PIA is described in below **Table-3.** There are also other PIAs, which will be identified by ITER-India / IO during MRR / MIP reviews / production process and bidder shall incorporate them into MIP. This identification will be based on **" ITER_D_SBYJXD - Guideline for Identification of the Protection Important Activities (PIA)"**

Table-3: List of Protection Important Activities (PIA)

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Stage of Manufacturing	Activity
Material of Construction	Chemical analysis (restricted concentration of Co, Nb and Ta), Mechanical testing
Manufacturing	Weld Data Package (WPS, WPQR, WPQ, NDE)
UT	Qualification of UT, in case it is used in lieu of RT
Welding Databook and associated controls	Welding

5. Regulatory requirement

DNB Vessel and HNB3 Vessel are outside the scope of the French Decree for Pressure Equipment and the French Order for Nuclear Pressure Equipment.

However, cooling circuit for internal components is classified as PED Cat. 0 and ESPN Nuclear Level N3 and cooling penetration in vessel are part of this cooling circuit, all the cooling water penetration shall follow the requirement of PED Cat. 0 and ESPN N3.

6. Document Organization

This technical specification document has associated documents:

- **Annexures and their parts:** Mandatory, obligatory and shall be applied during execution of the contract. (Table-4)
- **Applicable ITER Documents:** Mandatory and obligatory wherever it is referred directly within technical specification and its annexures, otherwise, these shall be considered as informative to understand the detailed requirements. (Table-5)
- **Informative and reference documents:** To be understood as a set of guidelines provided to assist through the execution of contract. (Table-6)

The technical specifications have been written in such a way that they include all the requirements of RCC-MR and IVH, except the inspection / testing procedures. For Inspection and testing procedures, the mentioned clause of RCC MR shall be followed. EN / ISO standards are not listed under the reference document, but referred directly within the technical specification and they are mandatory.


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Table 4: List of Annexures and their sections

Section B (This document)	Technical & management specifications, Scope of Supply and Scope of Work
Annexure 1	Technical Bid Format
Annexure 2	QA, QC, Inspection and testing
Annexure 3	Vacuum Quality Assurance
Annexure 4	Materials_General requirements
	Annexure 4A: Materials_Forgings for DNB Vessel Annexure 4B: Materials_Rolled or forged bars for DNB Vessel Annexure 4C: Materials_Plates for DNB Vessel Annexure 4D: Materials_Pipes for DNB Vessel Annexure 4E: Materials_Forgings for HNB3 Vessel Annexure 4F: Materials_Rolled or forged bars for HNB3 Vessel Annexure 4G: Materials_Plates for HNB3 Vessel Annexure 4H: Materials_Pipes for HNB3 Vessel
Annexure 5	Fabrication
Annexure 6A	Acceptance and Qualification of welding filler material
Annexure 6B	Welding Procedure Qualification
Annexure 6C	Qualification of welder and operators
Annexure 6D	Technical Qualification of production workshops
Annexure 6E	Production welds
Annexure 7	Cleaning and Cleanliness
Annexure 8	Pickling and passivation
Annexure 9	Pressure testing of cooling penetrations
Annexure 10	Leak Testing
Annexure 11	Dimensional Inspection
Annexure 12	Engineering Analysis
Annexure 13	Labeling, Packing, Handling and Shipping
Annexure 14	Engineering Drawings
Annexure 15	List of applicable standards




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Table 5: Applicable ITER Documents

Title	ITER IDM Identifier
Design Review Procedure	ITER_D_2832CF_v4.3
ITER Planning & Scheduling Manual	ITER_D_2DWMCW_v4.3
Quality Classification Determination	ITER_D_24VQES_v5.2
ITER Procurement Quality Requirements	ITER_D_22MFG4_v5.1
Requirements for Producing a Quality Plan	ITER_D_22MFMW_v4.0
Requirements for Producing a Manufacturing and Inspection Plan	ITER_D_22MDZD_v3.7
Manufacturing and Inspection Plan Templet	ITER_D_QV7GQF_v1.3
Procedure for management of Nonconformities	ITER_D_22F53X_v8.2
Procedure for management of Deviation request	ITER_D_2LZJHB_v8.1
Requirements for Producing a Contractors Release Note	ITER_D_22F52F_v5.0
Release note Templet	ITER_D_QVEKNQ_v3.1
00 - Nuclear Regulatory Framework for INB ITER	ITER_D_2WBB8P_v3.8
Order dated 7 February 2012 relating to the general technical regulations applicable to INB - EN	ITER_D_7M2YKF_v1.7
Overall supervision plan to supplier chain for Protection Important Components, Structures and Systems and Protection Important Activities	ITER_D_4EUQFL_v7.4
Safety Important Function and Components Classification Criteria and Methodology	ITER_D_347SF3_v1.8
PA monthly report	ITER_D_2E346G_v1.4
ITER CAD Manual and Procedure for the Usage of the ITER CAD Manual with Applicable	ITER_D_2F6FTX_v1.1

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Risk Management Plan (RMP)	ITER_D_22F4LE_v6.4
ITER Policy on Safety, Security and Environment Protection Management	ITER_D_43UJN7_v3.1
Provisions for Implementation of the Generic Safety Requirements by the External Interveners	ITER_D_SBSTBM v1.1
PBS 53 Defined Requirements	ITER_D_LAMFG2_v4.5
Propagation of the Defined Requirements for Protection Important Components Through the Chain External Interveners	ITER_D_BG2GYB_v3.3
Working Instruction for Manufacturing Readiness Review	ITER_D_44SZYP_v4.0
Guideline for Identification of the Protection Important Activities (PIA)	ITER_D_SBYJXD_v1.4
List of ITER-INB Protection Important Activities	ITER_D_PSTTZL_v2.2
ITER Vacuum Handbook Appendix 11 Standard Pipe and Pipe Fitting Dimensions Appendix 12 Leak Testing Appendix 13 Cleaning and Cleanliness Appendix 14 Passivation and Pickling Appendix 15 Vacuum Baking Appendix 19 Documentation and QA Appendix 2 Environmental Cleanliness Appendix 3 Materials Appendix 4 Accepted Fluids Appendix 5 Acceptance Checklist Appendix_21_Glossary_2F94QX ITER Vacuum Handbook Attachment 1 - Welding ITER Vacuum Handbook Attachment 2 - Cleanliness Requirements Relating to the Assembly of Vacuum Equipment	ITER_D_2EZ9UM v2.5 ITER_D_2E5PJK v3.0 ITER_D_2EYZ5F v1.4 ITER_D_2ELUQH v1.2 ITER_D_2F457S v1.2 ITER_D_2DU65F v1.3 ITER_D_2DMNNR v1.4 ITER_D_2EL9Y6 v1.4 ITER_D_27Y4QC v1.20 ITER_D_2ELN8N v1.14 ITER_D_2N4NDK v1.2 ITER_D_2F94QX v1.2 ITER_D_2FMM4B v1.5 ITER_D_MBXPP3 v1.7
Design Description of DNB Vessel	ITER_D_3RY46E
Design Description of HNB3 vessel	ITER_D_YRJ672
HNB3 vessel weld justification report and welding table (This document shall be taken into account while developing the manufacturing design)	ITER_D_2UQS9Z

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Manufacturing assessment of HNB3 vessel (This document shall be taken into account while developing the manufacturing design)	ITER_D_3K5H8V
DNB Vessel weld justification report and welding table (This document shall be taken into account while developing the manufacturing design)	ITER_D_4ADNG4
Manufacturing assessment of DNB Vessel (This document shall be taken into account while developing the manufacturing design)	
ITER Quality Assurance Program	ITER_D_22K4QX_v8.5
ITER Numbering System for Components and Parts	ITER_D_28QDBS_v5.0

Table 6: Informative and reference documents

Title	ITER IDM Identifier
Project Requirements	ITER_D_27ZRW8_v6.3
SRD	SRD-53-04 (DNB) from DOORS (2MRU8E v4.2)
ITER Load Specification	ITER_D_222QGL_v6.2
DNB Vessel Load Specification	ITER_D_3R7A9D v3.3
HNB Vessel Load Specification	<u>ITER D 33BQXF</u>
Material Properties Handbook	ITER_D_29DDBF (This will be provided upon request)
Instructions for Structural Analyses	ITER_D_35BVV3_v4.0
DNB Vessel Structural Analysis	This will be provided upon request
HNB3 Vessel Structural Analysis	This will be provided upon request

7. Technical interfaces

The technical interfaces with other system are not provided because the integration of DNB Vessel and HNB3 Vessel are in IO's Scope and necessary provision for assembly, if any, is considered in engineering drawings and specifications. All the interfaces details are provided in Design Description of DNB Vessel (ITER_D_3RY46E) and Design Description of HNB3 vessel (**ITER_D_3RY46E**) for information.

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Bidder shall respect the Geometrical interfaces defined by their dimensions and functional tolerances in the Built To Print Drawings. Any change affecting the geometry and the materials of these interfaces shall be approved by the ITER-India / IO before implementation.

8. Management Requirements

8.1 Selection of Bidder and its Subcontractors/Suppliers

Bidder shall perform all major activities in-house which include all assemblies and Factory acceptance test of DNB Vessel and HNB3 Vessel. All welding activities shall be performed in-house. Bidder may propose to subcontract any other activities as per following mandatory requirements.

Bidder shall obtain written approval from ITER-India for its subcontractors and Suppliers before placing any order/contract with them. Sub-contractor/Supplier QMS assessment will be carried out by ITER-India after receiving associated documents.

8.2 Procurement Follow-up

8.2.1 Manufacturing Follow-Ups

Manufacturing follow-ups and the related interventions shall be through the approved MIP (the content of the MIP shall be as per the format attached **ITER_D_QV7GQF_v1.3**). Manufacturing requirements. Typical interventions are presented in the **Table-7 below**, which shall be transmitted in MIP in terms of Notification Points, Authorization-to-Proceed Points, Witness Points and Hold Points. Additional Control Points will be identified by ITER-India and IO following review of the MIPs and as project progresses.

Any not foreseen operations in the Manufacturing Inspection Plan (MIP) provided during the MRR as, heat treatment for stress relieving, restoration of material properties, outgassing or any other purpose on assemblies or components shall be marked by the Bidder in an update of the Manufacturing Inspection Plan document. The update of the Manufacturing Inspection Plan document shall be submitted to ITER-India / IO for acceptance.



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Table-7: Typical intervention points (May be modified at discretion of ITER-India and IO)

Activities	ITER-India	IO
MRR as per clause 3.4 above	HP	HP
List of Bidder and sub- contractors	HP	R
Approval of Quality Plan (Bidder's and It's Subcontractors/Suppliers)	HP	R
Approval of manufacturing drawings, models and reports	HP	R
Delivery and acceptance of base materials and filler materials (Checking of all the material certificates and marking procedure)	HP	R
Approval of the manufacturing procedures documentation, before each manufacturing operation	HP	R
Approval of Manufacturing and Inspection Plan (MIP) (Bidder's and It's Subcontractors/ Suppliers), before each manufacturing and inspection operation	HP	R
Jigs, fixtures and tooling design	HP	R
Approval of the welding qualification documents and Production Proof Samples (if applicable)	HP	NP
Welding Inspection	HP	NP
Documents related to Welding	R	R
NDE Procedure Qualification, as applicable	HP	NP
Pressure testing of cooling penetration	HP	HP
Leak Testing	HP	HP


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NDE procedure qualification documents, NDE personnel qualification records and testing reports	R	R
leak test reports	R	R
Approval of the pressure testing reports	R	R
Dimensional Inspection and Visual test	HP	NP
Dimensional Inspection report and Visual Test report	R	R
Final dimensional inspection and Factory leak testing (All the test reports shall be provided to ITER-India)	HP	HP
Factory Acceptance	HP	HP
final cleaning	HP	ATPP
Final cleaning	R	R
Packing, shipping and handling procedure	HP	H
Packing inspection	HP	NP
End of manufacturing report	HP	HP
Delivery report review	HP	HP
Inspection after shipment	HP	NP
Inspection report review after delivery (Approval of this document is the closure of the contract	HP	R

NP: Notification Point

HP: Hold Point

R: identifies a document or report to be reviewed

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(Refer: ITER_D_QV7GQF_v1.3) for detail definition of the intervention points)

8.2.2 Quality Audits

Periodic QA audits shall be performed by ITER-India, IO with prior intimation. The standard frequency of QA audit is one year.

8.2.3 On the spot checks


In case of concerns regarding the quality of production / findings of QA audits, ITER-India shall have the right to request the bidder to carry out on-the-spot checks in addition to the checks foreseen in the technical specifications / MIP. In such a case, the actual date(s) of the on-the-spot checks shall be determined by agreement between the Parties.

8.2.4 Periodic Reviews

The Bidder shall organize Reviews and Status / Quality Control Reviews at various stages as defined in Table-8 below. This review may focus on the different manufacturing stages or particular areas of production. If required, I-I will appoint necessary group for review including IO personnel.

Table-8: Reviews

Sr. No.	Type of Review	Remarks
1	Manufacturing Readiness Review Meeting and approval of quality plan & MIP	MRR procedure shall be as per the IO guidelines ITER_D_44SZYP
2	Approval of manufacturing models and drawings (May be clubbed with MRR)	As per clause 8.7.2 of this section
3	Status Reviews (SR) and Quality Control Reviews (QCR)	Mutual agreement. These may be focused on particular areas of production and will be organized by ITER-India / IO as required by the progress and performance. The definition, occurrence and maximum duration of these possible SRs and QCRs will be mutually agreed by all parties and discussed at the MRR meeting.

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4	<p>Delivery Readiness Review (DRR)</p>	<p>As per Working_Instruction_for_the_Delivery_Rea_X3NE GB_v2_0 along with Delivery_Report_Template_WZPYVZ_v2_6</p>
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For each such reviews Bidder shall submit detailed report to I-I for review and approval. I-I may request additional data with regard to acceptance of these milestones.

8.2.5 Periodic Reports and Meetings

- Bidder shall prepare detailed manufacturing and delivery schedule on Primavera (latest version)/MS Project and shall submit monthly schedule progress updates as per guidelines provided in ITER_D_2DWMCW in line with agreed delivery milestones of contract.
- The bidder shall prepare monthly progress report for works carried out under this contract. The report shall be submitted as per guide lines provided in “PA Monthly Report”, ITER_D_2E346G and shall be submitted on 25th calendar day of each month. However, any activities that can cause delay shall be report immediately to ITER-India.
- In addition to the above reports Bidder shall also provide additional information or documents if requested by ITER-India.
- Project progress meetings shall be conducted as per mutual convenience. The frequency such meeting shall vary throughout the progress of tender, typically once in a month through Video/Tele conferencing or in-person discussion at ITER-India or Bidder premises. Minutes of each such meeting shall be prepared within (seven) 7 days by Bidder and subsequently sent for agreement with ITER-India.


8.3 Right of Access

8.3.1 Right access to ITER-India and IO

The bidder shall inform ITER-India of all locations where contract is executed. Bidder shall further ensure that contracts include the rights of on-the-spot access to specified locations subject to the following provisions in this section.

The bidder shall ensure that ITER-India's and IO's representatives are granted access to the premises of the bidder and its sub-contractors in order to witness on-site tests and critical fabrication operations, and to participate in periodic review meetings.

The bidder shall ensure that ITER-India and IO's representatives are granted access to the premises of the bidder and its sub-contractors at all reasonable times in order to carry out on-the-spot checks in addition to the tests foreseen in the technical specifications.

	<p>Manufacturing, testing and supply of vacuum vessels for HNB3 (Beam Line Vessel and Beam Source Vessel) and DNB</p> <p>Section-B: Technical & management specifications, Scope of Supply and Scope of Work</p>	<p>INDUS Ref No II-D8QD8EV- V1.3</p>
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The bidder shall grant access rights to ITER-India, IO and regulatory body representatives to its facilities and records and those of its sub-contractors for the purpose of Quality Requirements.

In case of marked up interventions in the Manufacturing and Inspection Plan, it is the bidder's responsibility to ensure that adequate notice is given to ITER-India and IO. However, the bidder shall not bear any costs of such travel arrangements.

ITER-India shall agree with the bidder in advance of the appointed ITER-India and IO representatives who will participate in activities described in the preceding sections. The appointed ITER-India and IO representatives must always be accompanied by the bidder's representatives on their visits to the bidder's and/or its sub-contractor's premises unless otherwise agreed by the Parties. ITER-India and IO representatives shall be bound by appropriate confidentiality obligations to be agreed in advance.

8.3.2 Right of access of the Third Party Inspection Agency (TPIA), French Safety Authorities and/or Agreed Notified Body / Notified Body


For the supply of items under this tender, the bidder shall ensure that TPIA (Appointed by I-I and IO) are granted free and appropriate access to its and its sub- contractors facilities, where this item is being manufactured and to the records for surveillance, inspection, (including unscheduled inspections) or audit as requested by them in accordance with the applicable national laws and regulations. Where possible, such access shall be coordinated in advance with ITER-India.

For the supply of items under this tender, the bidder shall ensure that the French Safety Authorities and/or Agreed Notified Body / Notified Body are granted free and appropriate access to its and its sub-contractors facilities, where this item is being manufactured and to the records for surveillance, inspection, (including unscheduled inspections) or audit as requested by them in accordance with the applicable national laws and regulations. Where possible, such access shall be coordinated in advance with ITER-India and IO.

8.4 Quality Assurance Requirements

The bidder shall ensure the quality of all components and services to meet all requirements of this specification and associated appendices of this tender document. In case of any clarification required with reference to requirements of this tender, the bidder shall request I-I for clarification prior to proceeding with the work.

The bidder's Quality Assurance (hereinafter referred to as "QA") Programme subject to approval by ITER-India and IO shall be applied to all the work under the tender.

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DNB Vessel and HNB3 Vessel shall be supplied with all manufacturing documentation required to satisfy reviews, validations, verifications, and other regulatory and licensing activity. This document specifies the required set of documentation to satisfy the foreseen activities.

Details of Quality documents to be provided by the bidder for at the various stages of contract execution are listed in Clause 3 of this Annexure (Scope of Supply). Bidder shall prepare and provide list of all document deliverables as per the stages mentioned therein.

These documents shall be transmitted to ITER-India at least three weeks before the associated milestone. All other documents related to the design, fabrication and testing (internal procedures, QA controls, etc.) are to be kept available to the ITER-India and IO throughout the manufacturing of the components.

In addition, the Bidder shall also provide technical and management documents as mentioned in respective Annexures of this spec. Part of this documentation may be included in the End of Manufacturing Report.

Quality Plans are produced by the bidder and its sub-contractors/suppliers to describe how they will implement the Quality Requirements specified in tender.

MIPs are used to monitor Quality Control and acceptance tests and shall be produced by the bidder and its sub-contractors/Suppliers and sent to ITER-India for intervention mark-up and approval from ITER-India and IO.

8.5 Licensing requirements


Bidder shall commit to apply all rules and implement all necessary actions imposed by French Law applicable to the IO.

If and when the IO establishes rules and regulations after signature of contract in order to comply with regulatory requirements, the bidder shall ensure to confirm to these.

8.6 Change Management

All requirements of this tender and subsequent changes and deviations proposed by either of the ITER-India or the bidder during the course of execution of the contract will be controlled with Deviation Request **ITER_D_2LZJHB** and Non-conformance Reports **ITER_D_22F53X**.

In case of design modification proposed by the INDA manufacturer, that will change the 3D geometry, it shall be checked that the design still withstand all loads defined in the Load Specification. The same shall be submitted to ITER-India / IO for acceptance and approval.

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Proposed changes and deviations will be implemented by the bidder after getting it approved by ITER-India and IO.

8.7 Information and Documentation Requirements

8.7.1 General documentation

8.7.1.1 The bidder shall prepare the following documents in the English:

- Intellectual Property provisions, if any,
- day-to-day correspondence and administration between the Parties,
- All documents that are necessary to determine the progress and status of work and validate the capabilities of involved suppliers,
- All QA and safety related documentation,
- All other documentation necessary to verify the sound management of the manufacturing and supply under this tender.

8.7.1.2 The working language of the tender will be English.

8.7.1.3 The bidder shall issue, manage and control its documents and records in accordance with Quality Plan.


8.7.1.4 The bidder shall ensure that all documents and records are uniquely identified and traceable by tender references, including subsequent revisions, and are made accessible to ITER-India.

8.7.2 Design documentation requirements (Refer **Annexure 14** for detailed requirements)

The bidder shall ensure that all manufacturing drawings prepared by the bidder or its suppliers shall comply with the **ITER CAD Manual** ([CAD Manual 03 - DO Organization and Responsibilities \(249WQN\)](#)) . Bidder shall prepare all drawings in CATIA (Version **V5 R23**). Typical approval cycle of manufacturing design steps is as explained below.

The Manufacturing Design shall be carried out by the Bidder in following steps:

- CAD Models at maturity Final Design, together with Built To Print drawings needed for additional information (e.g. general assembly drawings, interface tolerances, etc.), shall be provided by the ITER-India.
- The Bidder shall prepare manufacturing models, based on the CAD Models at Final Design provided by the ITER-India.
- Manufacturing Design Models shall be checked and approved by the ITER-India.

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- The Supplier shall prepare manufacturing drawings based on the approved Manufacturing Design Models; Manufacturing drawings shall also include the functional tolerances (geometrical and form), surfaces finishing that are to be provided at MRR.
- The Supplier shall start manufacturing based on these approved manufacturing drawings, following a Manufacturing Readiness Review.
- The Supplier shall submit final as built drawings and models to ITER-India and IO.
- The supplier shall also develop the manufacturing and assembly process to guarantee the fulfilment of the required dimensional and geometrical (form and positional) tolerances as well as the finishing tolerances.

Functional Reference (FR) and Part No. of ITER (PNI) (**Annexure 14: Engineering Drawings**) shall be included in all the manufacturing drawings (sub-components and assembly drawings) for DNB Vessel and HNB3 Vessel.

8.7.3 Quality Records

Quality Control and Acceptance Test records shall be maintained according to the procedures defined in **"Annexure 2_QA, QC, Inspection and testing"** of this tender.

Availability of the required data to ITER-India and IO shall be a pre-requisite for granting Authorizations to proceeding Point, Witness Point and Hold Point clearances.


8.7.4 Document Acceptance Requirements:

The Bidder has responsibility for the documents requested in this tender, therefore the Bidder shall review and approve any such document, before sending it to the ITER-India; The ITER-India returns the documents, marked as accepted or approved. Documents sent for information require no further decision (neither acceptance nor approval). But in case of major issue found in the content, ITER-India may raise the concern which required to be considered for incorporation in document.

Being an operator of the ITER facility and responsible entity for assembly and integration of DNB Vessel to the ITER machine, IO will be technically involved during documentation review process along with ITER-India.

Unless specifically mentioned in this tender, Standard document review cycle shall apply for all documents unless specifically mentioned.

- The ITER-India shall have fifteen (15) working days from the receipt of the Bidder's documents to review, comment and/or approve them, as the case may be;
- The Bidder shall have eight (8) working days from the receipt of commented documents to update and resubmit them to ITER-India; and

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- The ITER-India shall have eight (8) working days from the receipt of Bidder's submission to review and return the documents.

8.7.5. Data Management Requirements

The large amount of data generated during the execution of this contract shall be handled electronically and entered into IDM and /or ITER-India database (to be mutually agreed). The structure of this database shall be defined by Bidder in agreement with ITER-India /IO. The bidder shall use this database for storage of information related to this tender. The guidelines provided in "ITER Document Breakdown Structure Overview **ITER_D_43327Q v1.1**" and to the document "ITER Plant Breakdown Structure **ITER_D_28WB2P v2.0**" shall be used for organization of all the engineering data.

Exchange of documentation between the Supplier, the DA and the IO shall comply with the "Procedure on Procurement Documentation Exchange between IO, DA, and contractors **ITER_D_35BVQR v4.2**".

For a non-conformance report it shall be used the NCR Database **ITER_D_22F53X v8.2**.

Proprietary or confidential data entered in the database shall be kept strictly confidential by Bidder and the ITER-India, and in no circumstances shall be communicated or made accessible to other Bidders. Data consistency checks shall be implemented to facilitate Bidder and ITER-India oversight.

Data flow from Bidder to ITER-India shall be through the issue of notification for each time when data entered in to database by Bidder in form of documents, records, notification/Hold point clearance, Deviation request, Non-conformity report etc .

Note that all fabrication historical data shall be electronically archived following the ITER-India requirements and templates with reference to the component identification.


8.7.6 Communication

The Bidder shall not communicate directly with IO. Any communication with IO shall take place by ITER-India. If any situation arises during execution of this contract, ITER-India will co- ordinate with IO and Bidder.

In respect of contents of communication, the Bidder shall take note of the following:

Important Note:

DNB Vessel and HNB3 Vessel is an 'in-kind' contribution by India. There is every likelihood that the word 'credits', 'IUA', 'kIUA' or their conversions to Euro will be encountered by the bidder in private or public documents, presentations, formal and informal talks and in

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casual encounters during visits. These words/phrases are not at all related to actual financial aspects of the 'in-kind' procurement. They are an intricate way of measuring scope on a technical basis for ease in distribution among ITER Parties. Using such information as a basis for costing will be misleading. ITER-India would like to bring this warning to the notice of the bidder.

Furthermore, all and any information related to cost or financial aspects shall be exchanged only between pre-identified authorized personnel of ITER-India and the bidder. No communication, direct or indirect or any indication to that effect is allowed between the bidder (or his subcontractors) and any person (staff or contractor) of ITER Organization or any other Domestic Agency. Bidder must observe this condition strictly for the entire period of engagement and beyond.

8.8 Transportation

The Bidder shall be responsible for loading operation at factory for transportation of components to ITER site. Transportation from bidder's premises to the Indian Port (any one out of Nhavasheva (JNPT)/Mumbai, Chennai and Hazira) is in the scope of bidder, i.e Free On Board (FOB) Indian Port as per Incoterms 2020 for both the vessels. Contractor needs to specify any one port out of these three Indian ports in their bid. ITER-India shall undertake the remaining scope of transportation through separate contract under the Global Transportation Program with IO.

The Bidder shall ensure that the Items to be delivered are safely and properly packaged and fulfil the specific requirements regarding handling and packaging detailed in "Annexure 13_Labeling, Packing, Handling and Shipping"

Any objection in this respect shall be intimated in advance.

8.9 Delivery of DNB Vessel and HNB3 Vessel


All the deliverables shall be as per details mentioned in **clause 3** of this tender document.

8.10 Acceptance and Transfer of Responsibilities

Factory and site acceptance of DNB Vessel and HNB3 Vessel shall be carried out as per the procedure given in "**Annexure 2_QA, QC, Inspection and testing**"

Ownership of DNB Vessel and HNB3 Vessel shall be transferred to the IO through ITER-India, upon completion necessary acceptance test at site. .

The transfer of ownership to the ITER-India/IO shall not relieve the bidder of its obligations under this tender in case of non-conformities of the Items for the duration of the enforceable warranty as set out in given in Warranty clause.

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9.11. Risk Management

Bidder shall submit the risk plan covering all the activities to execute this contract to ITER-India within the 60 days from the date of award of contract for the approval. Risk management plan **ITER_D_22F4LE.**

The bidder shall implement all possible measures for risk reduction and mitigation following a graded approach and shall provide progress reports to ITER-India on a quarterly basis in accordance with the standard template to be agreed between ITER-India and the bidder. Risk Register standard template **ITER_D_2PMZYP9.**

If and when conditions to trigger specific risk reduction and mitigation measures occur, the bidder shall inform ITER-India promptly. The Parties shall consult on the appropriate actions to be taken and on their consequences for the execution of this tender.

9.12 Technical Obligation / Warranty

See Section A of this tender.